

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Applicants thank Examiner Won for agreeing to conduct an interview with Applicants' agent on December 2, 2011.

I. Status of Claims

The Reply amends claim 1 to include elements of claim 2 and cancels claim 2, without prejudice or disclaimer. At least paragraphs [0021] – [0022], of the filed application, support the additional revisions to claim 1. The Reply does not add any claims. Thus, the Reply adds no impermissible new matter to the claims.

Upon entry of the amendments, claims 1 and 11-36 will be pending and subject to examination on the merits. Claims 13-36 remain withdrawn.

II. The 35 U.S.C. § 103 Claim Rejection Should Be Withdrawn

The Office Action rejects claims 1-2 and 11-12 under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Published Application No. 2005/0093455 (“Tamura”). Without conceding to the propriety of the rejection, the Reply cancels claim 2 and amends claim 1 to include elements of claim 2.

Amended claim 1 calls for a vacuum tube having a reduced-pressure vessel that comprises, among other things, “at least a discharge gas sealed for electric discharge, wherein: the sum total of the number of organic gas molecules, the number of water molecules, and the number of oxygen molecules all of which remain inside a space of said reduced-pressure vessel is smaller than the number of molecules of said discharge gas, the number of water molecules which is adsorbed on an inner wall of said reduced-pressure vessel is not greater than 1×10^{16} molecules/cm², a ratio of said number of molecules of said discharge gas to the sum total of said number of organic gas molecules and said number of water molecules is not smaller than ten times.” Tamura fails to disclose, teach or suggest such a vacuum tube.

The Office Action incorrectly contends that “it is widely known in the art to reduce water molecules adsorbed on an inner wall because higher water molecules would deteriorate layers such as phosphor layers which would reduce the reliability of the lamp” (Office Action at p. 3). In making this contention, the Office Action relies on U.S. Published Application No. 2005/0263719 (“Ohdaira”), U.S. Patent No. 3,784,275 (“Wiedijk”), U.S. Patent No. 3,475,072 (“Graves”) and U.S. Published Application No. 2006/0097641 (“Ohmi”) (Office Action at p. 3). Ohdaira is not prior art.¹ Wiedijk and Graves merely disclose heating to remove adsorbed gas and water and that “[d]uring thermal treatment[,] part of the...phosphorous may become volatile and may be oxidized,” but fail to disclose, teach or suggest that reduction of water molecules adsorbed on an inner wall affects phosphor layers (Wiedijk at col. 1, lines 15-25 and Graves at col. 1, line 65 – col. 2, line 4). Similarly, Ohmi discloses heating “to a temperature that evaporates moisture adsorbed” but fails to disclose, teach or suggest a relationship between the adsorbed moisture and a phosphor layer (Ohmi at ¶¶ [0070] – [0074]). Consequently, it is not widely known in the art to reduce water molecules adsorbed on an inner wall as contended in the Office Action.

The Office Action acknowledges that Tamura “does not specifically disclose the number of water molecules adsorbed on an inner wall of the reduced pressure vessel is not greater than 1×10^{16} molecules/cm^[2],” but also states that “the examiner respectfully disagrees in part that Tamura does not suggest such limitation” (Office Action at pp. 2-3).

To the extent that the Office Action relies on Tamura to disclose such a limitation, Applicants respectfully disagree. The “description of the related art” section of Tamura discloses “a metal halide lamp...in which water content of the gas sealed in the discharge space is lowered to 130 ppm or less” (Tamura at ¶ [0009]) and the “brief summary of the invention” section of Tamura discloses that “the amount of water contained in the metal halide is set at 50 ppm or less,” (Tamura at ¶ [0019]) the “water content of the metal halide is defined to be 50 ppm or less” (Tamura at ¶¶ [0032], [0036] and [0040]) and “the amount of water contained in the metal halides constituting the light-emitting material 6 is controlled at

¹ The foreign priority date for U.S. Application No. 10/594,896 is March 31, 2004. Ohdaira published on December 1, 2005 from a U.S. application filed March 22, 2005 and, as such, Ohdaira is not prior art under 35 U.S.C. § 102.

50 ppm or less when measured under the extinguished state of the metal halide lamp 1” (Tamura at ¶¶ [0061] – [0062]). As a result, Tamura discloses that “it is possible to lower the amount of water released from the light-emitting material including the metal halide 6 during the lighting stage of the metal halide lamp 1” (Tamura at ¶ [0062]) and that suppressing an increase in water content during the lighting stage of the metal halide lamp “improve[s] the lamp life” (Tamura at ¶ [0015]). Consequently, Tamura only focuses on a decrease of an amount of water in a metal halide discharged during a lighting state of a metal halide lamp. Tamura fails to disclose, teach or suggest “the number of water molecules which is adsorbed on an inner wall of said reduced-pressure vessel is not greater than 1×10^{16} molecules/cm²” as recited in claim 1.

To the extent that the Office Action relies on “one of ordinary skill in the art [being] led to the recited ranges through routine experimentation and optimization” because “Applicant[s] ha[ve] not disclose[d] that the ranges are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical” (Office Action at p. 3), Applicants respectfully disagree. At least paragraphs [0021] – [0022], of Applicants’ application, rely on experimental results to disclose that the life time characteristics of a vacuum tube are significantly degraded when the moisture concentration in a gas becomes 100 ppm or less and that, “when the moisture concentration is 100 ppm or less, the adsorbed moisture amount becomes approximately 1×10^{16} molecules/cm².”

Tamura also fails to disclose, teach or suggest the sum total of various molecules remaining in a reduced-pressure vessel. For example, in example 1 of Tamura, Tamura fails to disclose, teach or suggest the amount of water or any interest in the amount of water remaining in Xe gas (Tamura at ¶ [0065]). Consequently, Tamura fails to disclose, teach or suggest “the sum total of the number of organic gas molecules, the number of water molecules, and the number of oxygen molecules all of which remain inside a space of said reduced-pressure vessel is smaller than the number of molecules of said discharge gas...a ratio of said number of molecules of said discharge gas to the sum total of said number of organic gas molecules and said number of water molecules is not smaller than ten times” as recited in claim 1.

For at least the aforementioned reasons, the rejection of claim 1 over the cited art is improper. Claims 11-12 depend from claim 1 and are allowable therewith, for at least the reasons that claim 1 is allowable, in addition to their respective recitations. Applicants respectfully request favorable consideration and withdrawal of the 35 U.S.C. § 103(a) rejection.

III. Conclusion


Applicants believe that the present application is now in condition for allowance and respectfully request favorable consideration of the amended application.

Examiner Won is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extension fees to Deposit Account No. 19-0741.

Respectfully submitted,

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